Contextual Effects on Individual Development of Subjective Well-Being in the Second Half of Life

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Abstract

Lifespan psychology and life course sociology have long acknowledged the role of context for individual functioning and development throughout life. Consistent with these conceptual notions, empirical studies show that various contextual factors influence development of individual-level outcomes. However, we know little about how contextual factors shape individual-level well-being and how well-being is influenced by fast changing contexts in the second half of life. Applying Bronfenbrenner's model of human ecology as the overarching theoretical frame, this dissertation examines three sets of contexts that differ in the degree of proximity in which individual well-being and its development is embedded in. As a first context, the multifaceted ecology of living and dying in former regions of East and West Germany is used to investigate how the macrosystem shapes individual well-being in the last years of life. For a second context, the role of the exosystem of county-level health care features (e.g., number of inpatient care facilities) on late-life trajectories in well-being is examined. As a third context, we examine how the microsystem of social ecologies and situations influences momentary affective well-being and how these associations differ across age. Jointly, the three studies in this dissertation show that regional, service, and social ecologies profoundly shape development in well-being during the second half of life. To conclude, this dissertation shows that these contexts influence both cognitive and affective components of well-being, among the affective domain two facets (valence and arousal), and investigates long-term and short-term context-well-being associations in later life phases. Results provide initial suggestions for interventions and malleable regional factors to maintain or improve well-being.

Zusammenfassung

Die Psychologie der Lebensspanne und die Soziologie des Lebensverlaufs betonen seit vielen Jahren die Bedeutung von Kontexten für den Erwerb individueller Fähigkeiten und die Entwicklung im Leben. In Übereinstimmung mit diesen konzeptionellen Annahmen zeigen Studien, dass verschiedene Kontextfaktoren die Entwicklung individueller Bereiche beeinflussen. Jedoch ist wenig darüber bekannt, wie kontextuelle Faktoren in der zweiten Lebenshälfte Wohlbefinden formen und wie Wohlbefinden in diesen Lebensphasen von sich schnell verändernden Kontexten beeinflusst wird. In dieser Dissertation werden unter Anwendung des Ökosystemischen Ansatzes von Bronfenbrenner als übergreifenden theoretischen Rahmen drei Kontexte unterschiedlicher Proximität untersucht, in die die Entwicklung des individuellen Wohlbefindens eingebettet ist. Als erster Kontext wird die vielfältige Ökologie des Lebens und Sterbens in den ehemaligen Regionen Ost- und Westdeutschland herangezogen, um herauszufinden wie dieses Makrosystem Wohlbefinden in den letzten Lebensjahren gestaltet. Als zweiter Kontext wird die Bedeutung des Exosystems von Gesundheitseinrichtungen in Landkreisen (z.B. Anzahl stationärer Pflegereinrichtungen) auf Wohlbefindensverläufe am Lebensende beleuchtet. Als dritten Kontext untersuchen wir, wie das Mikrosystem sozialer Ökologien und Situationen momentanes, affektives Wohlbefinden gestaltet, sowie Altersunterschiede in diesen Assoziationen. Gemeinsam zeigen die drei Studien dieser Dissertation, dass Ökologien auf regionaler, dienstleistender und sozialer Kontextebene Entwicklung von Wohlbefinden in der zweiten Lebenshälfte beeinflussen. Diese Arbeit zeigt, dass diese Kontexte sowohl kognitives als auch affektives Wohlbefinden und innerhalb des letzteren zwei Facetten (Valenz und Aktivierung) beeinflussen, und untersucht länger- und kurzfristige Kontext-Wohlbefindens-Assoziationen in späteren Lebensphasen. Die Ergebnisse liefern erste Vorschläge für Interventionen und veränderbare regionale Faktoren für die Erhaltung oder Verbesserung von Wohlbefinden.

List of Papers

This dissertation is based on the following original papers

Vogel, N., Gerstorf, D., Ram, N., Goebel, J., & Wagner, G. G. (2015). Terminal decline in well-being differs between residents in East Germany and West Germany. *International Journal of Behavioral Development*. Advance online publication. doi: 10.1177/0165025415602561

Vogel, N., Ram, N., Göbel, J., Wagner, G. G., Gerstorf, D. (under review). How does availability of county-level care characteristics shape late-life development in well-being? Manuscript under review at *Psychology & Aging*.

Vogel, N., Ram, N., Conroy, D. E., Pincus, A. L., Gerstorf, D. (submitted). Social Context and Affect: Age Differences in how the Social Ecology and Social Situation Shape Individuals' Affect Valence and Affect Arousal. Manuscript submitted for publication in *Emotion*.

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1 Introduction

Lifespan psychological and life course sociological theories consistently emphasize the importance of contexts for individual functioning and development, suggesting that such contextual embedding can create both constraints and advantages for individual development (Baltes, 1987; Bronfenbrenner, 1979; Elder, 1974; Faris & Dunham, 1960; Riley, 1987). A large body of research finds that contexts, such as social environments, neighborhoods, municipalities, and nations, shape individual-level outcomes, including health and disability across adulthood (Burkhauser, Giles, Lillard, & Schwarze, 2005; Pruchno, Wilson-Genderson, & Cartwright, 2012; Schüz et al., 2015; Uchino, 2006; Voigtländer, Berger, & Razum, 2010; Wen, Hawkley, & Cacioppo, 2006), well-being across adulthood (Diener, 2000; Kotakorpi & Laamanen, 2010; Lawless & Lucas, 2011; O′Campo et al., 2015; Oishi, Schimmack, & Diener, 2012), and well-being in old age (Antonucci, Lansford, & Akiyama, 2001; Kelley-Moore, Cagney, Skarupski, Everson-Rose, & Mendes de Leon, 2015; Krekel, Kolbe, & Wüstemann, 2016; Litwin, 2010; Luhmann, Murdoch III, & Hawkley, 2014; Pethtel & Chen, 2010). However, little is known about how such contexts are related to the development of well-being in late life (e.g., the last 15 years of life) and how contextual embedding shapes short-term fluctuations in well-being. To bear fruit on the role of context on well-being, the three studies that make up this dissertation investigate three contexts that might be particularly important in later phases of life (Antonucci, 2001; Kane et al., 2004; Motel-Klingebiel, Simonson, & Tesch-Römer, 2010; Rowe & Kahn, 1997; Shippee, Henning-Smith, Kane, & Lewis, 2015; Vogt, 2013): the regions comprising East and West Germany, health care provision in counties, and overall social ecologies and momentary social situations. Thus, this dissertation aims at contributing to the understanding of how three contexts of different degrees of proximity to the individual lead to differential well-being trajectories.

Well-Being in the Second Half of Life

Subjective well-being is usually considered to have cognitive-evaluative (e.g., life satisfaction) and affective (e.g., valence and arousal) components (Diener, Suh, Lucas, & Smith, 1999) and is assumed to be a central component and subjective outcome of successful aging (Rowe & Kahn, 1997). Both well-being components are investigated in this dissertation with the cognitive-evaluative component being operationalized with a single-item global judgement measure of life satisfaction (Schimmack & Oishi, 2005). The affective component is captured with affect valence and affect arousal, which are two independent dimensions, have physiological bases, and together constitute the construct core affect (Barrett, 2005; Russell, 2003).

Looking at subjective well-being from a lifespan developmental perspective, studies found it to be stable throughout adulthood and old age (Diener, Lucas, & Scollon, 2006; Diener & Suh, 1997; Horley & Lavery, 1995; Smith, Fleeson, Geiselmann, Settersten, & Kunzmann, 1999), thus providing the impetus for the "stability despite loss paradox" label (Kunzmann, Little, & Smith, 2000; Staudinger, 2000). The heart of the paradox centers on the fact that losses accumulate in very old age, leading to the conclusion that self-regulation and adaptive processes are robust and efficient throughout life. Theories explaining life span developmental patterns in well-being suggest that older individuals shift their motivation away from information seeking to more well-being maintaining goals, having acquired social skills to regulate their well-being efficiently, but also show vulnerabilities in persevering affective arousal (socio-emotional selectivity theory; Carstensen, Isaacowitz, & Charles, 1999; strength and vulnerability integration model; Charles, 2010). Meanwhile, mounting longitudinal results – using notions of terminal decline (Kleemeier, 1962) – repeatedly show that affective and cognitive well-being follow trajectories of accelerated declines in the last years of life (Gerstorf, Ram, Mayraz, et al., 2010; Gerstorf, Ram, Roecke, Lindenberger, & Smith, 2008; Schilling, Wahl, & Wiegering, 2012; Vogel, Schilling, Wahl, Beekman, & Penninx, 2013). However, it

is important to note that there are huge interindividual differences in levels and in both short-term changes and long-term development in well-being across the second half of life, thus providing ground for examining factors contributing to different patterns of trajectories (Gerstorf & Ram, 2012, 2013; Ram & Gerstorf, 2009). These contributing factors can be distinguished in characteristics residing within the individual (i.e., individual-level variables such as gender, education, and disability) and features attached to the individual's environment (contextual-level variables such as the region where individuals live).

The Role of Individual-Level Factors

Since individual characteristics might be associated with well-being outcomes in the second half of life, age or age at death, gender, education, and disability or health status are included as controls in this dissertation. First, following the evidence presented in the previous section, the age of the individual is controlled for as a proxy for changes across life span. In addition, studies investigating late life indicate that the age at death of individuals is related to levels and changes of well-being development. The age at death might reflect psychosocial and physiological resources and risks, as well as the accumulation of these throughout life (Schilling et al., 2012). To illustrate, Gerstorf and colleagues (2010) report that compared to individuals aged 70 to 79 at death, individuals aged 80 and higher experienced steeper declines in life satisfaction compared to their younger counterparts. Furthermore, differential associations with well-being could emerge with gender since women have lower financial means (e.g., pension, Moen, 1996). In line with this reasoning, Pinquart and Sörensen (2001) find that, compared to older men, older women report lower cognitive and affective well-being. Higher education (e.g., more years of schooling) provides a proxy for socio-economic resources that are related to higher well-being across adulthood into late life (Blanchflower & Oswald, 2004; Gerstorf, Ram, Goebel, et al., 2010). Studies report that because of their impediments on everyday life and possibly long lasting negative effects, adaptation to disability and poor health is incomplete, resulting in lower well-being trajectories (Lucas, 2007; Smith, Borchelt, Maier, & Jopp, 2002).

The Role of Context

Accounting for individual level factors, this dissertation primarily examines contextual factors and the extent to which these can contribute to differential development in well-being. In sum, individual differences in well-being offer a fertile ground for identifying factors that contribute to differential well-being trajectories in old age and for finding factors related to terminal decline in late life. I start by describing important contextual theories, then give an overview of what is known from previous empirical studies, and finish with a model explaining the context-well-being link.

Theoretical notions on the contextual embedding across adulthood

Several lifespan and life course perspectives highlight contextual embedding of adult individuals emphasizing the importance of environmental factors for development (Baltes, 1987; Elder, 1974; Riley, 1987). For example, social disorganization theory (Faris & Dunham, 1960) suggests that ecological factors (e.g., characteristics of one's neighborhood) are more important than individual characteristics in predicting which individuals are more prone to become socially deviant. Structuring such environmental factors, Lawton's environmental gerontology highlights how different environments play a role in human behavior: it is not just different types of personal environments, but also social and physical environment (Lawton, 1982). In addition, some theories suggest that contextual features might become more important as individuals grow old and functions decline (Baltes, Staudinger, & Lindenberger, 1999; Lawton & Nahemow, 1973). For example, the environmental docility and proactivity hypotheses (Lawton & Nahemow, 1973) explain the influence of context on individual development as a function of one's change in functioning. While the proactivity hypothesis suggests that with higher degree of functioning, individuals are more independent of context characteristics, the environmental docility hypothesis states that context characteristics become more important for development with declines in functioning: "As the competence of the individual decreases, the proportion of behavior attributable to environmental, as contrasted

with personal, characteristics increases“ (Lawton & Nahemow, 1973, p. 658). For example, an 85 year old adult with deteriorating vision might only be able to independently shop for groceries in stores that provide a magnifier for product descriptions. In a similar vein, Baltes (2007) claims that intraindividual development is embedded in contextual paradigms and that – due to decreases in biological functioning – the role of environmental influences increases as individuals age.

The main contextual framework of this dissertation is the model of human ecology by Bronfenbrenner (1979), which is displayed in Figure 1. In Bronfenbrenner's model human development is an interplay of individuals and their environment. He suggests a model of different structures of external influence as well as different degrees of proximity. Leaving the individual with their characteristics, the next concentric system, the *microsystem*, describes the immediate "pattern of activities, roles, and interpersonal relations experienced by the developing person" (Bronfenbrenner, 1979, p. 22) in settings such as work and family. Interrelationships between entities within this system (e.g., experiences from family and from work) or with entities to more distal systems (e.g., friends of family) where the individual plays an active role are picked up by the *mesosystem*. The next concentric system, the *exosystem*, depicts local institutions, including social services, neighbors, and media, that do not necessarily play an active role in an individual's development but might influence the individual's setting or are influenced by the individual. Finally, the most distal concentric system, the *macrosystem*, which becomes apparent on all levels previously discussed, can be understood as their embedding into "the

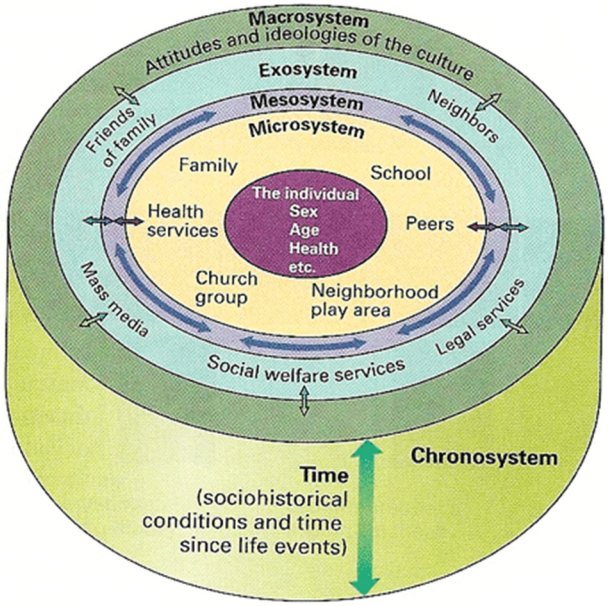

Figure 1. Model of Human Ecology (Bronfenbrenner), s*ource*: Santrock, 2007

subculture or the culture as a whole, along with any belief systems or ideology underlying" (Bronfenbrenner, 1979, p. 26). The system transforming this theory from a static to a developmental one is the *chronosystem* (Bronfenbrenner, 1986), which adds a time dimension, thus enabling the theory to capture different time scales. In sum, several theoretical notions, including Bronfenbrenner's model of human ecology, emphasize the role of contextual influences on individual-level outcomes such as well-being in old age and late life, and suggest that individual development is embedded in various ecological systems of different proximity to the individual.

Empirical evidence for contextual embedding of individual-level outcomes

A large body of literature documents the role of contextual effects on individual-level outcomes across adulthood and old age. These studies show that contexts, including cultural values, economic factors on nation- and county-levels, neighborhood assets, as well as individuals' social resources, are related to health and disability (Browning & Cagney, 2003; Clarke & Smith, 2009; Park & Huang, 2010; Pruchno et al., 2012; Schüz et al., 2015; Uchino, 2006).

Empirical studies also examine the role of a variety of contexts for well-being in adulthood and old age, many of which can be operationally defined within Bronfenbrenner's model of human ecology framework. With no clear-cut definitions as to which context is represented by which system, this dissertation follows the following notations: *Macrosystem* is referred to literature studying nations, countries and cultures. For example, higher well-being is related to living in a democratic nation, more wealth in a country, and social characteristics (e.g., frequency of contact with family) of the region (Diener, 2000; Inglehart, Foa, Peterson, & Welzel, 2008; Litwin, 2010). Bronfenbrenner's *exosystem* is studied in contexts such as natural environment, socio-political structures, and factors on regional units within a country; all of which may not necessarily influence the individual directly but do have indirect effects. To illustrate, increased access to green urban areas, better health care level on municipality

level, and higher (objectively assessed) health and education on county level are related to higher well-being (Cutrona, Russell, Hessling, Brown, & Murry, 2000; Kotakorpi & Laamanen, 2010; Krekel et al., 2016; Lawless & Lucas, 2011). Literature tracking the *mesosystem* is found in studies investigating interrelations of different systems, such as contexts of the individual and contexts of significant others (for an example, see Schaie, Willis, & Pennak, 2005). *Microsystems* are frequently investigated in psychological research, focusing on a range of individual's social ecologies. To illustrate, quality of marital relationships, positive close relationships, and interactions with friends (compared to family) are related to higher well-being (Antonucci et al., 2001; Merz & Huxhold, 2010; Ramsey & Gentzler, 2015). Finally, the *chronosystem* acknowledges that the influences of contextual systems on the individual are embedded in (historical) time. Empirical examples studying the *chronosystem* investigate, for example, cohort or age group differences, as well as accumulating regional disadvantage across time (Clarke et al., 2013; Schaie et al., 2005).

Two pieces of information are of note. First, up to now, this dissertation has not explicitly considered that context characteristics can change, sometimes over longer time frames such as years and decades, sometimes over shorter time frames such as days and hours – a perspective that is very much in line with Bronfenbrenner's *chronosystem*. With the acknowledgement that individual functioning and development can also change on short-time scales (Mehl & Connor, 2012; Nesselroade, 1991; for a review for well-being, see Röcke & Brose, 2013) and that evolving experience sampling studies can track such short-time changes (Carstensen et al., 2011; Ram et al., 2014), an emerging literature shows that short-term changes in the *microsystem* (e.g., social characteristics) are associated with momentary well-being. For example, adults' momentary well-being varies depending on the familiarity of the interaction partner (Downie, Mageau, & Koestner, 2008). Although some studies investigate age differences in the social context of affective well-being (Mejía & Hooker, 2015; Oishi, Kurtz, Miao, Park, & Whitchurch, 2011), little is yet known about how short-time changes in social

characteristics, such as importance of the interaction and gender composition, are associated with momentary affect valence and affect arousal in older adults. Second, although the body of literature studying contextual effects in old age is growing, contextual embedding at the end of life is barely studied. One exception is a study by Gerstorf et al. (2010) showing that that differences between counties account for about eight percent in differences of life satisfaction trajectories during the last 15 years of life.

To conclude, studies show that contextual factors at the *macro-, exo-, meso-*, and *microsystem* levels shape individual-level outcomes, including well-being across adulthood and old age. However, we know little about these links in late life and about short-time changes in old age.

Contextual factors as risk regulators

To explain how context shapes well-being, we refer to the model of contextual factors as risk regulators (Gerstorf & Ram, 2012; see also Glass & McAtee, 2006). According to this model, contextual factors such as cultures, historical epoch, and regional factors of economic, social, service, and physical characteristics operate as moderators – so-called risk regulators, influencing individual level regulation and adaptation processes. Thereby, regional factors do not necessarily affect individual development directly, but rather indirectly by moderating the effects of individual-level variables (e.g., health) on developmental patterns (e.g., subjective well-being). For example, whether health constraints and disability result in declines of subjective well-being could depend upon the availability of health care services. In particular, through available outpatient care services individuals could not only receive care services and support in daily activities but also be enabled to stay in their familiar environment. Similarly, from a more macro-perspective, whether such health constraints and disability result in more or less successful trajectories, could also depend on the region individuals lived in during the last decade of their life. To illustrate, individuals living in former East Germany might face an agglomeration of negative living conditions such as avoidable diseases, worse health care

distribution, and old age poverty (Frommert & Himmelreicher, 2010; Mand, Muller, Lefering, Ruchholtz, & Kuhne, 2013; Nolte, Scholz, Shkolnikov, & McKee, 2002)

2 The Current Dissertation

This dissertation aims to test longstanding theoretical notions in order to shed light on the role of context on development in well-being in the second half of life. Study 1 and 2 aim at applying Bronfenbrenner's model at the end of life, following the framework of terminal decline to capture development of mortality related ageing. Study 3 investigates age differences in the role of a proximal, fast changing context, namely social characteristics.

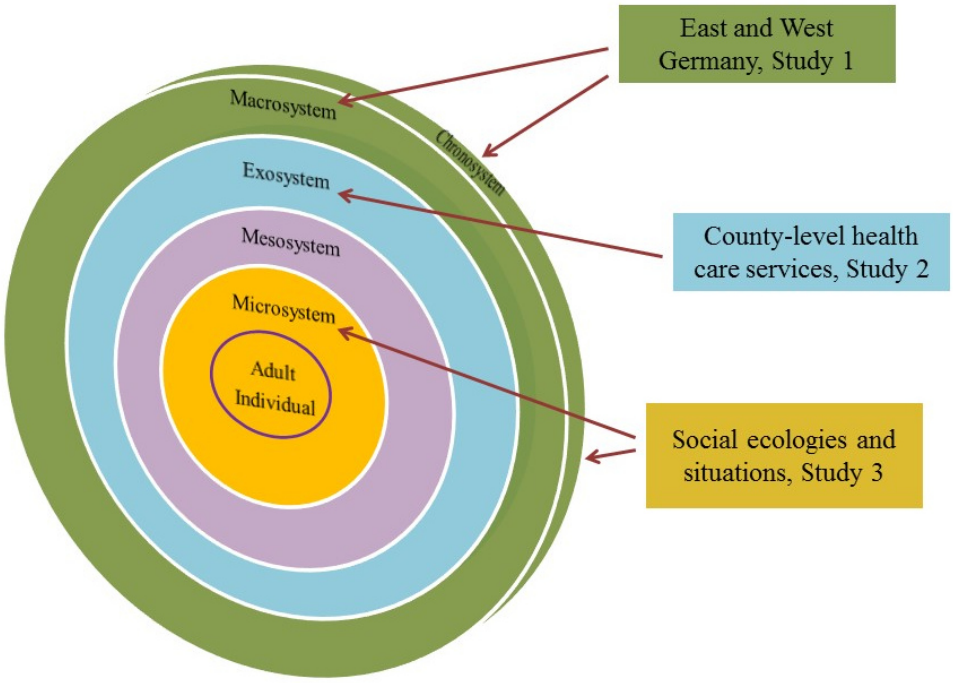

Figure 2. Context operationalization in current dissertation with Bronfenbrenner's model of Human Ecology (1979)

Purposefully sidestepping interrelations between the static systems (including the *mesosystem* according to Bronfenbrenner), this dissertations aims to investigate the unique role of the three distinct systems of the *macro-, exo-, and micro*-levels. To address the overarching question of whether and how contextual embedding influences development of well-being, we

run multi-level models with longitudinal annual well-being reports of now deceased adults from the Socio-Economic Panel (SOEP) and momentary well-being reports of a lifespan sample from the Intraindividual Study of Aging, Health, and Interpersonal Behavior (iSAHIB). The first study addresses interindividual differences in late-life development of life satisfaction in East and West Germany, thus operationalizing context at the *macrosystem* level. Profound changes in political regulation, ideologies, and other historical changes in divided Germany came with many disadvantages for individuals in East Germany, leading us to hypothesize that East Germans experienced lower levels and steeper declines in their life satisfaction than their West German peers. Since reunification happened in 1990, we also expect life satisfaction trajectories between the regions to converge with the passing of time. In Study 2, we examine the role of regional (here, counties) health care characteristics, such as number of outpatient and inpatient services, on individual development in life satisfaction. Operationalizing context as the *exosystem* in Bronfenbrenner's model, we test whether and how characteristics of care services influence late-life trajectories and hypothesize that more beneficial health care features in one's county (e.g., better care ratio) are associated with more successful life satisfaction trajectories in the last decade of life. Finally, within-day assessments of social interactions and their characteristics allow us to test Bronfenbrenner's *microsystem* (social context) with intensive longitudinal data in the third study. We hypothesize that features of the overall social ecology that individuals are embedded in (between-person differences) and the momentary social interactions that individuals have throughout their day (within-person changes) influence momentary levels in affective well-being. This study is based on a lifespan study, thus allowing for the investigation of such associations in individuals up to 89 years old. In addition, the *chronosystem*, the embedding into (historical) time, is included with the time passed since the reunification of Germany in Study 1 and momentarily changing social situations in Study 3.

3 Summary of Results

The three studies comprising this dissertation aimed at investigating the role of different types of contextual embedding for development in well-being. Context was operationalized as the region where people lived and died (East and West Germany), care characteristics of one's county, and the social context individuals are embedded in. How contextual factors, on various levels, influence development of well-being was investigated. We found support for the contextualized embedding of development in well-being for all three considered contexts (region, local care characteristics, as well as social ecologies and interactions).

The first study suggests that the region where people live and die plays a role in the development of life satisfaction during the last 15 years of life. Exploiting the (quasi-) natural experiment of East and West Germany, we illustrate how cumulative disadvantage in East Germany during up to 40 years of German separation shaped late-life trajectories. As shown in Figure 2 and Table 2 and 3 in Study 1, East Germans reported lower life satisfaction than their West German peers until their death (Table 2, $\gamma_{01} = -4.58$, $p < .0001$), even after controlling for key individual characteristics, but the gap between both regions vanishes with proximity to death (Table 3, $\gamma_{31} = 0.44$, $p < .002$) and increasing time since reunification (Table 2, $\gamma_{012} = 0.15$, $p = .009$). This paper contributes to the existing literature by showing that the *macro*-context of accumulated disadvantages in a region is relevant for end-of-life processes in well-being and that plasticity in human development in well-being can also take place in very late life.

Moving to more concrete and tangible contextual features and a more proximal regional unit, the second study illustrates how service characteristics of the environment shape late-life trajectories in life satisfaction. By linking contextual data from care statistics with longitudinal reports of life satisfaction of the last 15 years of their life from deceased study participants, we find that some characteristics of local care facilities contribute to late-life development of well-being. Results shown in Table 2 of Study 2 indicate that more inpatient facilities ($\pi_{005} = 20.63$,

p = .02), better resident to staff ratio (π_{003} = – 3.64, p < .01; plotted in Figure 2), and more administrative staff (π_{009} = 0.15, p = .02) in inpatient facilities were associated with higher levels, and fewer shared rooms (π_{105} = – 0.32, p = .02; for more shared rooms) with shallower declines in life satisfaction. This paper adds to the existing literature in two ways; first, by providing evidence that characteristics of objectively measured local health care provision contribute to well-being experienced at the end of life. Second, administration-based regional structures such as counties provide a regional context at which well-being is shaped.

Considering an even closer contextual level and acknowledging that well-being can also change on short time scales (e.g., across hours), the third study aimed to investigate the role of social ecologies and momentary social situations on affective well-being and age differences in these associations. In detail, we operationalized social context with four characteristics (familiarity of interaction partner, importance of interaction, type of social partner, and gender composition) and affective well-being with core affect (affect valence, affect arousal). Results indicate that both social ecologies and momentary social situations contribute to levels in core affect and that there are some age differences therein. Older individuals experienced higher affect arousal when they had in general more important interactions (Table 2, γ_{05} = 0.02, p = .002; shown in Figure 3B) and less affect arousal when they currently interacted outside the family (Table 3, γ_{14} to γ_{17}, ps < .01). Having a friends- or co-workers-centered social ecology (Table 3, γ_{07} = –.47 and γ_{08} = –1.01, ps < .05, respectively) was associated with lower affect valence in older adults. The contribution of this paper to the existing literature is twofold. This study takes two different time scales into account by distinguishing social context characteristics in their general features and momentary features. Second, this study investigates social context associations with an often neglected affective dimension, namely affective arousal.

4 Discussion

This dissertation examined the role of contextual effects on well-being in the second half of life for three different contexts: the *macrosystem* of living and dying in East or West Germany, the *exosystem* of local health care availability, and the *microsystem* of social ecologies and social situations. Controlling for key individual characteristics, individuals reported higher levels or shallower decline in well-being in the last 15 years of life when they died in West Germany and in counties with more beneficial health care provision (e.g., more inpatient facilities, fewer residents per staff). In addition, older individuals reported higher momentary affective arousal when they had social ecologies with more important interactions and when interacting outside the family. Higher momentary affective valence in older individuals was associated with a mainly family-focused network and when interacting with friends. In line with long standing contextual and life span theories, these results are taken as an indication that regional and social embedding shapes development of well-being reports on both longer and shorter time scales.

With respect to the outcome, this dissertation took a holistic approach, examining well-being with both its cognitive-evaluative and affective components (Diener, 2000). Together, the three studies of this dissertation showed that well-being is stable or even slightly increases across life span and follows a terminal decline with accelerated decreases during the last 15 years of life which is in line with previous findings (Gerstorf, Ram, Estabrook, et al., 2008; Gerstorf, Ram, Mayraz, et al., 2010; Smith et al., 1999). Furthermore, we found interindividual differences in well-being; namely in levels of momentary core affect and life satisfaction two years before death, in linear (in both single- and multi-phase models) and quadratic changes in long-term development of well-being (see random variances in Tables 2 and 3 in Study 1, Table 2 in Study 2, and Tables 1 to 4 in Study 3). In addition, there were considerable differences between counties in their well-being levels and changes in the last years of life. In sum, these

results on interindividual and county-level differences support previous findings that old age and late life enable the investigation of factors contributing to more and less successful well-being trajectories, for example with individual-level and contextual-level factors (Gerstorf & Ram, 2012, 2013; Ram & Gerstorf, 2009).

The Role of Individual-Level Factors

As expected, individual characteristics contribute to well-being trajectories in all three studies. First, Study 3 indicates that older adults reported slightly higher affect valence (but do not differ in affect arousal) compared to younger adults. Of note, some of this age difference was only relevant for subtypes of the social context (e.g., for familiarity but not type of social partner), indicating that social context characteristics can carry age differences in affective well-being. Moreover, we confirm previous findings that individuals' age at death is related to late-life well-being trajectories (Gerstorf, Ram, Goebel, et al., 2010) and showed with two different operationalizations of age (age groups in Study 1 and chronological age in Study 2) that higher age at death was associated with higher levels and slightly steeper declines in life satisfaction. The direction of the association between gender and well-being differed across the studies. In the *macro*- and *exo*-contexts (Study 1 and Study 2) men experienced higher levels or less steep declines in well-being (as reported in Pinquart & Sörensen, 2001). With respect to social context, however, we found in Study 3 that for women interacting with other women, affective well-being was higher than for men interacting with men which is in line with previous findings (e.g., Buhl, 2009; Wheeler, Reis, & Nezlek, 1983). One possible explanation for these differential findings on the association between gender and well-being across the different studies could be attributed to context specificity, indicating that men and women might report different levels of well-being depending on the context examined (*macro*-regional vs. *micro*-social context). Another argument for context specificity of this association is the cross-level interaction finding that living in counties with higher proportions of older adults diminished well-being among men. It is possible that further individual characteristics are associated

differently with well-being in different contexts, for example as a function of degree of proximity. As expected, higher education was associated with higher levels and shallower declines of late-life satisfaction. Due to individuals' high education level in the iSAHIB study (on average 16 years of schooling compared to 11 years in the SOEP sample), education was not included in Study 3 (and caution with sample generalizability was made transparent). Finally, consistent with previous literature (Lucas, 2007; Smith et al., 2002), disability was associated with lower levels of life satisfaction and steeper declines, but better health with higher affect valence and affect arousal (with indication for context specificity in affective well-being as described above). In follow-up analyses of Study 1, we found that living with a partner and being religiously active were also associated with higher well-being in late life. In sum, we confirm previous literature that individual level factors account for a considerable portion of differences in well-being trajectories.

The Role of Context

The overarching theories underlying this dissertation are contextual theories of individual development (Baltes, 1987; Elder, 1974; Lawton, 1982; Riley, 1987) and, in particular, Bronfenbrenner's model of human ecology (1979). Despite varying specifications of the types, relations between, and number of contexts, these theories agree on the salient role of contexts on various levels including those investigated in this dissertation. The *macro*-regional context, the *exosystem* indirectly influencing context such as health care provision, and the *microsystem* social ecologies and situations all shape outcomes of individual development in behavior, thoughts, and well-being. In addition to these umbrella theories, two of the studies were based on more specific theories tailored for each contextual focus and the research question at hand. The first study was also built on the theory of cumulative inequality (Ferraro & Shippee, 2009) and assumed that differences in late-life trajectories arise from effects of accumulative disadvantages in East compared to West Germany (e.g., lower financial means for health care). Embracing economic and sociological disparities of *macro*-contexts, this

theory specifically suits our endeavor to investigate the lasting effects of two profoundly different political, economic, and social systems that were combined in 1990 to form modern Germany. In general, the inequality theory could be applied to many other contextual phenomena in psychology and highlights one important, yet still neglected, aspect in contextual research: The possible change in contextual influence over time (see also Clarke et al., 2013), which is comparable to Bronfenbrenner's *chronosystem* that is discussed later in this section. To derive hypotheses on how our long-term and short-term social environment is associated with well-being, the third study with its very proximal social context was based on theories from social psychology (Baumeister & Leary, 1995; Moskowitz & Zuroff, 2004) and life span psychology (Carstensen et al., 1999; Charles, 2010). Of interest for this dissertation are, in particular, the psychological life span theories, strength and vulnerability integration model (Charles, 2010) and socio-emotional selectivity theory (Carstensen et al., 1999), which offer hypotheses in which strengths, vulnerabilities, and socio-emotional competencies develop as adults become older and when the time frame in life is narrowing (despite not explicitly making assumptions about the last years of life, i.e., with respect the time left to live). On the one hand, these theories suggest that older adults' motivation shifts toward engaging in more meaningful social interactions and that they develop skills to regulate their emotions more efficiently. On the other hand, older individuals are also more vulnerable to experiencing affective arousal. Together, these theories offer a great ground for testing how social context affects well-being in old age. In sum, the studies comprising this dissertation were placed in the general theoretical framework of contextual embedding and, as applicable, were also based on context-specific theories.

The findings of this dissertation support the above described contextual theories and previous empirical results. In line with studies showing that a variety of contextual units are related to individual outcomes (Pruchno et al., 2012; Schüz et al., 2015; Uchino, 2006) and that *macro-, exo-, and microsystem* are related to well-being outcomes in older populations

(Inglehart et al., 2008; Kotakorpi & Laamanen, 2010; Ramsey & Gentzler, 2015), this dissertation shows that dying in West Germany, having beneficial care characteristics in your county, a social ecology mainly focused on family and consisting of high important interactions are associated with higher well-being (including higher arousal) in old age and late life. Following suggestions in contextual research to not only focus on longitudinal measures on the individual level but also to consider development in contexts (e.g., macro-trends in societies, short-time changes in social world, *chronosystem*), this dissertation covered contextual changes in two of the three studies. Study 1 controlled for the time that has passed since reunification (assuming that individuals who died longer after the reunification experienced assimilating trends between East and West Germany as well as acknowledging possible confounding cohort effects). Change of contexts was even more systematically investigated in Study 3 with the moving in and out of different social situations throughout a day, which was documented with affective well-being and characteristics of the social interaction after each social interaction. In both the first and third study, results indicate that the role of time-varying contexts is important for development in well-being. Theoretically, acknowledging changes in health care characteristics would have been possible and important in the third study as well. In particular, the obligatory long-term care insurance in Germany has undergone many changes since its 1995 introduction, which could have effects on well-being. In practice, however, one major obstacle for using time-varying context variables is transforming the data into a format that can be worked with is, at times, extremely difficult for some contextual units (e.g., changing regional borders of counties, which need to be unified) and easier for others (e.g., geocoded area around individuals' homes, changing level of familiarity with interaction partner). Furthermore, all three studies found that some, but not all, of the contextual features examined had effects on development of well-being. This can be interpreted in various ways: For example, some contextual variables might be more important than others, emerging as significant effects. However, this could also be traced back to methodological issues of operationalization and

measurement of these contexts in the used datasets or an insufficient number of cases (e.g., low number of individuals in some counties) for which these are estimated (see Bryan & Jenkins, 2015, for a methodological discussion).

Contextual factors as risk regulators

According to the risk-regulator model (Gerstorf & Ram, 2012; Glass & McAtee, 2006), contextual factors are moderators that exacerbate or alleviate the relationship between two variables. For example, as argued above, the relationship between disability and well-being outcomes might depend on the availability of inpatient and outpatient care facilities surrounding the individuals' home. Within the framework of contexts as risk regulators, East and West Germany (Study 1) can be placed in the macrosystem with different national characteristics and county-level care features (Study 2) in the regional-level service domain. Both studies provide support that East and West Germany and county-level health care factors operate as risk regulators in late life, indicating that living and dying in West Germany and having beneficial care characteristics in one's county might alleviate terminal well-being trajectories.

Context is handled very differently in psychological research. While in the risk-regulator model, contextual variables are assumed to have moderating effects, in the third study, the social ecology of individuals is expected to have direct effects on individuals' momentary well-being. Thus, here context is considered as a source of variation and as a catalyst that brings about differences and change. Very often context is considered a nuisance that one needs to control for. For example, in experimental research, researchers try to hold constant as many conditions as possible (e.g., time of day) to exclude possible effects of variables other than the ones of interest. Finally, context can also be considered as a mediator carrying the effect. Methodologically, we cannot easily distinguish this effect with the current state of field on multi-level models, so the role context plays in this dissertation is driven by theoretical assumptions and needs to be investigated in future studies.

While the risk regulator model suggests how contextual influences at various levels can moderate individual-level development, less is known about whether the role of a risk regulator changes as a function of proximity to the individual. For example, while service characteristics of one's county might represent regional resources, it is not yet well understood how this resource influences an individual's well-being when the individual is not affected. One possibility is that the influence of risk regulators on well-being becomes more indirect as a function of increasing distance to the individual and is carried in other domains (e.g., health). For example, Wen, Hawkley, and Cacioppo (2006) suggest that older adults, who are more prone to consider an environments' immediate relevance for health compared to younger adults, will evaluate many more specific features of the environment (e.g., available facilities) as risk factors (e.g., not receiving their disease-specific support).

Limitations and Outlook

In this section, I outline the limitations of this dissertation with respect to measures, design, and samples. Then I close by discussing implications for intervention and prevention. I argue that although there are shortcomings in measures (e.g., selective measures of context), design (e.g., causal direction between context and well-being), and samples (e.g., deceased vs. old individuals), the qualities of the three studies conducted in this dissertation mutually advance our knowledge of how *macro-, exo-, and microsystems* shape development of well-being in old age and late life.

Measures

First, context was operationalized with different degrees of specification in the three studies, which might have led to some contexts being represented more thoroughly than others. In the first study, East and West Germany were broad proxies for the cumulative contextual effects of living conditions in these two different regions because data tracking specific differences (e.g., norms and values, perceived inequality) were not available or, if available,

only for a small portion of participants, which would not have allowed for tracking late-life trajectories. While precise quantitative measures were available for care availability (Study 2), measures of quality (e.g., quality of physical care rated by experts) were not available. However, the tradeoff for using these measures is having uniform measures of care for each county. Although highly specific and both quantitative and qualitative in nature, the social context variables in Study 3 each consist of single items. This is due to minimalizing burden for the participants in the experience sampling study. Certainly, including both objective (e.g., care characteristics from German Federal Statistical Office) and subjective measures of context, and having contextual features of various proximities are two qualifications of this dissertation. With contextual data becoming more and more of interest and available in research, future studies will also be able to investigate more precise, quantitative and qualitative components, and constructs of contextual data.

Second, care should be taken when generalizing contextual influences across different well-being domains. The studies investigating *macro- and exosystem* influences found associations with cognitive well-being, whereas the study investigating *microsystem* found associations with affective well-being. Other studies point to the possibility that the cognitive outcome – life satisfaction – is more suited to evaluate well-being in more *macro*-level contextual variables such as living conditions. On the other hand, the affective component – here affect valence and affect arousal – is more suited to investigate closer contextual features (Luhmann et al., 2014; Schimmack, Schupp, & Wagner, 2008) that are less prone to cognitive evaluation but rather to a free floating affective reaction. To put it differently, the strength of association between a particular well-being domain and a context might depend on the degree of proximity of the context at hand to the individual (with more distal, *macro*-contexts having more influence on the cognitive-evaluative well-being component). However, since the studies had either data of one or insufficient data of both well-being components, the extent to which different contextual systems influence the same well-being component and the same context

shapes different well-being components is left to future research. Noteworthy with respect to measures of well-being, is that this dissertation sheds light on momentarily experienced levels in affect valence and affect arousal, allowing an examination of affect activation with the arousal dimension, a less explored affect component with respect to age differences and contextual influences (Kessler & Staudinger, 2009; Labouvie-Vief, Grühn, & Mouras, 2009). In addition, what level of affect arousal in old age might not be pleasant and represent high well-being should be studied more (e.g., vulnerability in Charles, 2010, but energetic arousal in Theyer, 1989; Wrzus, Müller, Wagner, Lindenberger, & Riediger, 2013). Future research can compare both the affective and cognitive domain more directly and bolster initial findings that the affective domain becomes less and the cognitive domain more important as a function of proximity of context.

Finally, due to constraints in data availability, only a limited set of correlates were examined in the three studies, and further individual-level (e.g., social resources such as family living nearby) or context-level factors (e.g., funds for health care in a county) might contribute to levels and changes in well-being. For example, well-being reports of older individuals who have a variety of instrumental support by close others might be less based on availability of care in their county (i.e., estimated with the cross-level interaction between support and availability of care). One of the most striking questions with respect to the contribution of contextual features, which this dissertation was not able to track due to lack of data, is whether individuals freely choose a context or its happenstance is unavoidable (e.g., unpleasant interaction with a family member, use of formal care services). Thus, future studies should incorporate measures of (degree of) choice of societal structures in order to enable researchers to investigate the association between opportunities of older individuals to shape their environment (Lang & Heckhausen, 2006) and well-being outcomes.

Design

While the causal direction in our statistical models was that contexts influence individuals' well-being, reverse causality is also possible. For example, when individuals are in a bad mood they might be more likely to seek an interaction with a good friend. This could also be generalized to *exo*- or *macro*-contexts. More satisfied individuals might seek different kinds of services or even move to an area with characteristics enhancing quality of life. For example, individuals with higher SES are more likely to move to more affluent neighborhoods. Research examining the direction of causality is needed.

Multi-level growth curve models were the method of choice in all three studies because they allow for the nesting of longitudinal measures within individuals and nesting of individuals within higher order contextual units. In the first study, spline (multi-phase) models were used in addition to multi-level models to explore the terminal decline phenomenon. The dichotomous nature of regional context in the first study (i.e., East and West Germany) allowed for the parsimonious approach of including the contextual factor on the between-person level as a binary variable. In the second study, however, an extra level with counties was included to nest individuals within the 371 counties. This not only allows for calculating the variance of individual differences in level and change attributable to differences between counties but also for including predictors on county-level (i.e., care characteristics). The third study used continuous social context variables to classify individuals' social embedding, and distinguished situational variations in social context (within-person changes) and between person measures representing individuals' overall social ecologies (Bolger & Laurenceau, 2013). Although an additional level for the social context variable would have been possible by creating artificial groups that sum up individuals with specific context characteristics (e.g., individuals who only have interactions with individuals they know very well), we made use of the fine-grained nuances of the social context scales (0 to 100). Interestingly, in this study classification to context itself (e.g., high familiarity) already contained the values (e.g., 80) of social

characteristics and an additional level with social context variables was not needed at this point, although future studies could nest individuals in an additional higher order social context level.

In general, the variance explained by contextual variables (e.g., five percent in Study 2) seems rather low compared to variance attributable to differences between individuals. However, studies from experimental research show a comparable level of explained variance and it is not clear whether the small amount arises from measurement mismatch of context.

Sample

With data stemming from two different sources, the comparability of samples should be treated with caution. The first two studies were based on the Socio-Economic Panel (SOEP) data. The SOEP is a unique German national-wide data set providing up to 31 waves (as of 2016) of longitudinal reports of life satisfaction with a huge range of correlates and possibilities to being linked regionally to other large-scale panels (e.g., to INKAR by community identification number). Since this data set also has sufficient deceased participants (about 5,000, as of 2016) it allowed us to investigate the terminal decline phenomenon in well-being and interindividual differences therein. The third study used data from the iSAHIB study, which – due to the short time scale nature of an experience sampling study – does not include deceased participants and, thus, does not allow for investigating late life changes. However, the strengths of this study, measuring well-being after each social interaction over 9 weeks spread across about a year in a life span sample leads to 64,000 measurement points in total, including older adults. Thus, these data offer great opportunities to look at age differences and, together, the three studies can investigate the second half of life, including old age and late-life.

Since "the structure and function of processes at any one level of behavior (biological, psychological, cultural), are influenced by the structure and function of processes at other levels" (Ram et al., 2014, p. 144), the next step is to integrate what was examined in each separate study included in this dissertation to investigate the role of multiple layers of contexts and multiple time scales for well-being as well as their possible interactions. Three research

examples for future research under which such a framework could be pursued are suggested here: First, one could look at the same contextual feature on different levels; for example, the role of long-term care regulations on the *macro*-level (e.g., differences between nations), availability of care characteristics at the *exo*-level (as has been done in Study 2), as well as the role of professional and family caregivers on the *micro*-level. Secondly, interrelations between different contexts should be investigated. To illustrate, when examining the role of local health care facilities, one could (if data allows) also include a level of social context and the influences therein. This setup would not only allow for consideration of interactions of contexts (e.g., between *micro*- and *exosystem*) and how this combination influences well-being, but in addition allow for examination of various contexts as time-varying variables to account for the change of contexts in addition to change in individual perceptions and behaviors. Similarly, Bronfenbrenner's *mesosystem* could be investigated by interrelations of several *microsystems* (e.g., relating both social contexts of the individual and their interaction partners). On a side note, a controlling estimate in Study 3 might actually be an operationalization for *mesosystem*: the interaction between social ecology and social situation of the same social context type (e.g., importance of the interaction, Table 2). Finally, data allowing researchers to integrate different time perspectives of different contexts are needed. That is, data from an experience sampling study (e.g., iSAHIB) integrated in a longer-term developmental study (e.g., SOEP) across multiple contexts would enable the disentangling of the role of longer- and short-term influences of multiple levels of contexts and link these to short-term and long-term outcomes in well-being. However, having an experience sampling study shortly before death will probably remain an exceptionally challenging research endeavor. In the literature on context, it seems that differences between social characteristics, neighborhoods, nations, and cultures are the main interest (or also available units) of research. Other contextual units, such as county-level characteristics and geocoded areas around an individual, are much less investigated.

To conclude with how future contextual research in the second half of life can live up to systematically taking a life span focus, I refer to four suggested principles (e.g., Ferraro & Shippee, 2009; Glass & McAtee, 2006). First, it needs to be considered that earlier exposure to the same contexts shapes later associations between well-being and the context at hand. For example, the role of important interactions on affect arousal might be shaped from early childhood when children witness their parents' affective arousal reactions to a broad range of social contexts. Second, the onset and timing of such an exposure needs to be tracked. For example, Vogt (2013) finds that older adults were the ones who profited most from the reunification and the improvements it brought for East Germans (e.g., higher pension levels). Third, a context needs to be understood with respect to its cumulative effects. Does it matter for well-being reports whether our participants lived 20 or 40 years in East Germany? Finally, associations between context and well-being can also be influenced by historical events. To illustrate, the introduction of obligatory health care insurance in Germany could have increased awareness of care possibilities and their enrichment for life, thereby strengthening the association between care quality and well-being. All four aspects would ideally be included in the same study.

Implications

Following implications for intervention and prevention can be derived from the findings of this dissertation. Study 1 touches a politically, societally, and individually important topic in Germany – implications of separation and reunification of Germany. Many efforts have been made to compensate for the disadvantages in East Germany that developed during the separation; for example within economic and health services domains. While the implications on many domains are studied, late-life is rarely the focus (Behle, 2005; Frijters, Haisken-DeNew, & Shields, 2004; Schäfer, 2010). The results from the first study are a step toward understanding whether interventions might be needed until late life. The second study provides initial suggestions for malleable factors in the care sector for more successful aging trajectories

and, thus, might provide guidelines for health policies as to which characteristics of care need to be improved and which need to be extended to facilitate less steep declines of well-being at the end of life. Finally, the third study focuses on a shorter time scale and aims at advancing knowledge as to what role contextual characteristics play in within-day change by examining well-being in interactions. Results from this study might provide insights on whether the choice of contextual characteristics (e.g., interaction partner) lead to a limited range of experienced affects in daily late life.

Considering the findings from the three studies, we learn that cognitive and affective well-being in short-time change or long-term development are influenced by *macro*-regional, *exo*-service, and *micro*-social context in the second half of life, and that changes in contexts also contribute to these well-being trajectories.

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